

Poplar Grove Road Bridge
Spanning Chicago & Northwestern Railroad on Poplar Grove Road
Lebanon Vicinity
Dodge County
Wisconsin

HAER No. WI-98

HAER
WIS
14-LEBA.V,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Great Lakes System Office
1709 Jackson Street
Omaha, Nebraska 68102-2571

HISTORIC AMERICAN ENGINEERING RECORD

POPLAR GROVE ROAD BRIDGE

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Location: Poplar Grove Road over the Chicago & Northwestern Railroad
Lebanon Vicinity, Dodge County, Wisconsin

USGS Ixonia Quadrangle, Universal Transverse Mercator Coordinates: Zone
16 Easting 370460 Northing 4789480

Present Owner: Town of Lebanon

Present Use: Vehicular bridge

Significance: The Poplar Grove Road Bridge utilizes a single span, two lane, Warren Double-Intersection pony truss. Erected in 1883 by the Alden and Lassig Bridge and Iron Works of Chicago for the Chicago & Northwestern Railroad, and rebuilt in 1910 for highway use by the Lassig Plant of the American Bridge Company, the span was identified in *Cultural Resource Management in Wisconsin* (the state's cultural resource management plan) as one of the state's best examples of a Warren Double-Intersection pony truss with inclined endposts.¹ With its integrity largely intact, the Poplar Grove Road Bridge is significant as an excellent example of an increasingly rare, late nineteenth and early twentieth century bridge-type.

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of erection: 1883, 1910²
2. Architect: Unknown
3. Original and subsequent owners: Public ownership.
4. Builder: Alden & Lassig Bridge and Iron Works (1883); Lassig Plant,

¹Barbara Wyatt, ed., *Cultural Resource Management in Wisconsin*, Vol. 2 (Madison: State Historical Society of Wisconsin, Historic Preservation Division, 1986), Transportation, 12/11.

²"National Register of Historic Places Determination of Eligibility for Poplar Grove Road Bridge," prepared by Timothy F. Heggland, 11 December 1993, 7/2, copy on file at Heritage Research, Ltd., Menomonee Falls, WI.

American Bridge Company (1910)³

5. Alterations and additions: The historical integrity of this structure is generally good, although the floor system original to the 1883 bridge was modified to facilitate the structure's 1910 evolution from railroad to highway use. As well, the structure's verticals were installed in the 1910 refitting.⁴

B. Historical Context:

COUNTY & LOCAL AREA HISTORY

Dodge County was officially organized in 1840; however, white settlement began in 1836, with the arrival of Jacob P. Brower, John Cole, Amasa Hyland and Luther A. Cole. Brower's family was the first in the area, establishing a homestead in the county's northwest corner, at Fox Lake. Settlement in the east half of the county did not really begin until 1844-1845, when Horicon and Mayville were established.⁵

Although iron ore was discovered and mined in the Mayville/Iron Ridge area, agriculture was the primary focus of those who inhabited Dodge County. Indeed, by 1860, over fifty percent of the county's land was used for farming. Agricultural development continued. By 1870, the county had 4,913 farms occupying 505,660 acres. (Note that the current total acreage of Dodge County is 564,734 acres.) The number of farms and the acreage devoted to their operation stayed relatively constant well into the twentieth century.⁶

It is within this agricultural context that the Town of Lebanon evolved. The first white settlers arrived in 1843 and consisted of immigrants from Brandenburg, Germany. Most were farmers who left their homeland to escape religious intolerance. H. Braasch had previously selected the settlement site. Timbered hills and a marshy area associated with the Rock River influenced his choice, as he proclaimed, "Here, we have both wood and hay." Settlers immediately began to clear and farm the land. By 1846, the town had been organized as the name *Lebanon* was approved. William Woltmann suggested a Biblical namesake for this hilly settlement established by Christians. As Lebanon attained a population of 1,621 by

³Ibid., 7/1.

⁴Ibid., 7/2.

⁵*History of Dodge County, Wisconsin* (Chicago: Western Historical Company, 1880), 321-23.

⁶*A Century of Wisconsin Agriculture, 1848-1948* (Madison: Wisconsin Crop & Livestock Reporting Service, 1948), 15, 87; *State of Wisconsin: 1995-1996 Blue Book* (Madison: State of Wisconsin, 1995), 672.

1879, it was apparent that the agricultural, German and religious orientations of the community had remained constant. An 1880 history describes the town as "exclusively a farming community, its almost entire population being Germans," where little else but churches and schoolhouses exist.⁷

Indeed, Lebanon remained a town of little change, a fact that undoubtedly magnified the arrival of the Chicago & Northwestern Railroad by 1913. Work regarding the line began in 1910, eventually resulting in the construction of the Poplar Grove Road Bridge. To appreciate fully the bridge's history, it is helpful to understand the developmental context of this structure's Warren double-intersection pony truss design.

TRUSS BRIDGES IN WISCONSIN

The two most commonly found types of truss bridges are the Pratt and Warren. These two classifications are further subdivided into pony or low trusses, overhead or through trusses and deck trusses. The Warren truss, which two British engineers patented in 1840, placed nominal stress on the vertical members, while the diagonals served as both tension and compression members. Caleb and Thomas Pratt patented the Pratt truss in 1844, incorporating vertical compression members and diagonal tension members. During the nineteenth century, the Pratt truss seemed to be more popular because it used less iron and was easier to erect. In the 1870s, numerous variations in the Pratt design were introduced for long-span bridges. To save money and material, engineers "bent" the top chord into a polygonal configuration, thereby creating a Parker truss. If the top chord had exactly five sides, it was called a "camelback" truss. The increased live loads of locomotives and rolling stock necessitated further design innovations. The addition of subtrusses and/or subties greatly fortified truss bridges and transformed a Pratt into a Baltimore and a Parker into a Pennsylvania truss--the latter considered a "major advance in strengthening the Pratt truss." Another development which sparked much debate around the turn-of-the-century involved the merits of pin connections versus riveted connections for main truss members. Proponents of riveted bridges cited the advantages of increased structural rigidity and the reduction of damaging vibrations; advocates of pin-connected bridges emphasized the theoretically correct stress distribution and the smaller amount of required metal. Although no dramatic resolution occurred, a compromise of sorts was reached in the early twentieth century. Riveted bridges were designed with less duplication of members, and pin-connected bridges, suitably

⁷W.F. Whyte, "The Settlement of the Town of Lebanon, Dodge County," in *State Historical Society Proceedings: 1915* (Madison: State Historical Society of Wisconsin, 1916), 105, 109, cited in "Determination of Eligibility for Poplar Grove Road Bridge," by Heggland, 8/1-2; *History of Dodge County*, 409, cited in Heggland, 8/2.

detailed, were still accepted for long-span highway bridges.⁸

These developments affected Wisconsin bridge construction, but other circumstances were equally important. Until the latter nineteenth century, individual bridge companies were largely responsible for bridge design. Consequently, there was little, if any, standardization of design, although Pratt truss bridges seemed to predominate. Indeed, the state's oldest truss bridge, the 1877 White River Bridge in Burlington, is a Pratt. The Good Roads Movement of the late 1890s and early 1900s, however, prompted a dramatic shift with regard to bridge design by promoting greater involvement on the part of local officials and, especially, the state government. In 1907, the state legislature established a Highway Division with the Wisconsin Geological and Natural History Survey to conduct experiments in road design and to provide professional advice to local governments about specific projects.⁹

The following year, Wisconsin voters overwhelmingly removed the greatest obstacle to creating a progressive statewide system of bridge and highway construction by eliminating the state's constitutional prohibition against direct state aid to transportation projects. In 1911, the legislature made its first appropriation for highway improvements. In addition, it transformed the Highway Division into an autonomous State Highway Commission (SHC), responsible for overseeing the expenditure of state funds for the development of a state highway network.¹⁰

The SHC emphasized the use of standardized plans for various types of bridges and culverts. Prior to this time, metal truss bridges dominated crossings of all lengths. After 1911, however, the SHC promoted the construction of girder, beam or slab spans of steel and/or concrete for short crossings (less than thirty-five feet). The SHC particularly favored concrete spans, citing the advantages of lower cost, greater compatibility with aesthetic treatment and greater adaptability to remodeling, especially in terms of roadway widening. Despite its predilection for concrete bridges, the SHC continued to design truss bridges for spans of thirty-six feet or more. The riveted Warren became the state's standard pony design. Indeed, this design became the state's most common type of highway truss bridge. Of the approximately 450 Warren trusses in the state in 1980, over four-fifths were riveted pony trusses built according to SHC standard plans. The SHC also drafted a standard plan for riveted, overhead Pratt trusses. In the first three-and-one-half years of its

⁸Jeffrey Hess, Robert M. Frame, III, Robert S. Newbery and John N. Vogel, "Bowen Mill Bridge," Historic American Engineering Record (HAER) Report, HAER No. WI-67 (1992): 3-5, copy on file at the Library of Congress, Washington, D.C.

⁹Ibid., 5-6.

¹⁰Ibid., 7.

work, the SHC designed over fifteen hundred bridges of all types. Practically all the local bridges in the state during these years were either designed by the SHC or were based on SHC standard plans. The SHC continuously revised its truss designs, drawing upon the latest engineering information. In the 1930s, the SHC made a major commitment to keeping its standardized plans up to date by dropping the Pratt design in favor of the Warren for all overhead truss configurations. Although concrete designs eventually dominated bridge construction, metal truss bridges remained cost effective in many situations. Consequently, the SHC continued to design truss bridges until well after World War II.¹¹

The number of highway truss bridges in Wisconsin has dwindled substantially over the years. In 1976, under the sponsorship of the State Historic Preservation Office (SHPO) of the State Historical Society, George Danko initiated the first systematic study of Wisconsin truss bridges. By 1980, when WisDOT established the Historic Bridge Advisory Committee (HBAC), seventeen bridges had been listed or found eligible for listing on the National Register of Historic Places. The HBAC pursued the statewide inventory of truss bridges, which then accounted for approximately one-tenth of the state's 10,386 surviving highway bridges built before 1950.¹²

The HBAC identified an initial pool of 996 pre-1941 truss bridges that represented seventeen structural types. The HBAC screened this pool to identify the following for each truss type: those bridges which had the earliest known construction dates; those in the best condition; bridges with the best available historical data; and those with the most noteworthy features. Also considering bridges in park settings, this winnowing process reduced the initial pool to 247. The most significant bridges within each truss category were determined by applying criteria--modified as necessary--that were developed in a Virginia study. The evaluation process yielded a final group of fifty-three bridges deemed potentially eligible for the National Register. Historians Jeffrey A. Hess and Robert M. Frame, III, contracted to complete a field survey and compile historical data for those bridges in 1986. The final survey totaled fifty-four bridges, including two already listed on the National Register (P-18-720 and P-53-162).¹³

THE POPLAR GROVE ROAD BRIDGE

The Poplar Grove Road Bridge was built exclusively to carry road traffic over the

¹¹Ibid., 7-8.

¹²Ibid., 8-9.

¹³Ibid., 9-10.

double tracks of the Chicago & Northwestern Railroad. This Chicago-based railroad, which can trace its roots to 1848 and the Madison & Beloit Railroad, was the product of several mergers. By 1880, consolidations resulted in a network throughout five states, with over one-third of the track mileage in Wisconsin. Indeed, the extensive system made the Chicago & Northwestern one of the most significant in Wisconsin by the early twentieth century. To tap into some of the state's more productive agricultural markets, the Chicago & Northwestern considered adding a line from West Allis to Necedah in 1910. Double tracks were laid for this line, which was under the control of the Milwaukee, Sparta & Northwestern Railroad--a branch of the Chicago & Northwestern. The tracks passed through Lebanon Township, with a depot built in the hamlet of Lebanon. Although this greatly facilitated transportation for area farmers and their produce, the new service did not significantly alter old habits. Even after the line became operable in 1913, many Lebanon residents continued to haul their goods six miles to Watertown, where both the Chicago & Northwestern and Chicago, Milwaukee & St. Paul had been providing rail service since the late nineteenth century. Perhaps general indifference toward the new line stemmed from an initial dispute in 1910 concerning the railroad and its consequences for a local road.¹⁴

According to the routing of the line through Lebanon, the tracks would cross an extant east/west roadway (present-day Smith Road). Conditions were such that an at-grade crossing was not feasible, while an overhead bridge at that point would need to be approximately 350 feet long. To enable the easiest possible crossing, officials of the Milwaukee, Sparta & Northwestern branch sought to close part of the road. They wanted to relocate the remainder of the thoroughfare 300 feet south of its original location, to a spot that would accommodate a shorter bridge. Acting on behalf of local residents, who wanted to maintain the current roadway, the town board denied the railroad's plan. Given this impasse, officials of the railroad enlisted the State Railroad Commission as an arbiter. Considering that the extant road served relatively few people while the rerouting constituted a slight inconvenience at most, the commission approved the railroad's plan.¹⁵

¹⁴"Determination of Eligibility for Poplar Grove Road Bridge," by Heggland, 8/3-8/6; *History of Dodge County*, 176-78, cited in Heggland, 8/4; "Begin Work on Northwestern Line," *Watertown Daily Times*, 3 March 1910, p. 3, cited in Heggland, 8/5; "MS & NW RR vs. Town of Lebanon," in *Opinions and Decisions of the Railroad Commission of the State of Wisconsin*, vol. VI (Madison: Democrat Publishing Co., 1912), 424-31, cited in Heggland, 8/5; William Fletcher Thompson, gen. ed., *The History of Wisconsin* (Madison: State Historical Society of Wisconsin, 1985), vol. III, *Urbanization & Industrialization, 1873-1893*, by Robert C. Nesbit, 116-17; *Official Railroad Map of Wisconsin, 1906* (n.p., 1906).

¹⁵"Determination of Eligibility for Poplar Grove Road Bridge," by Heggland, 8/5; "MS & NW RR," in *Opinions and Decisions*, vol. VI, 424-31, cited in Heggland, 8/5-6; *Wisconsin Atlas & Gazetteer*, 3d ed. (Freeport, ME: DeLorme Mapping, 1992).

Shortly thereafter, work began on the Poplar Grove Road Bridge. The location is approximately one mile east of the disputed road crossing--at a point where apparently no road had existed much before the Chicago & Northwestern arrived in Lebanon. Although this Warren double-intersection pony truss bridge was reconstructed in 1910, its history dates back to the late nineteenth century. In 1881, John Alden and Moritz Lassig, the former general superintendent of the original American Bridge Company, founded the Alden & Lassig Bridge and Iron Works Company of Chicago. In 1883, the partners built a three-span railroad bridge for the Chicago & Northwestern. The structure was erected in Des Plaines, Illinois, but the railroad dismantled it in 1909. By that time, the Alden & Lassig firm had long been dissolved. Indeed, Lassig's subsequent venture, known as Lassig Bridge and Iron Works, had been bought out by the new American Bridge Company. The latter was responsible for remodeling the trusses from the Des Plaines railroad bridge, which the Chicago & Northwestern then used to construct highway bridges, including the Poplar Grove Road Bridge. Aside from remodeled trusses, this structure was erected with a modified floor system and wooden deck to accommodate the locale's light highway traffic over the railroad. The bridge subsequently spanned the tracks and facilitated the movement of local traffic for approximately ninety-five years. It is now scheduled for replacement.¹⁶

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character: The Poplar Grove Road Bridge was built in 1883 and rebuilt in 1910. It is a single span, Warren Double-Intersection pony truss that contains seven panels.
2. Condition of fabric: The historic fabric of this bridge is generally good; however, several of the structure's integral components are experiencing severe section loss.

B. Description:

The primary component of the Poplar Grove Road Bridge is a single span, Warren

¹⁶*Plat Book of Dodge County Wisconsin* (Minneapolis: C.M. Foote & Co., 1890); *Plat Book of Dodge County, Wisconsin* (Des Moines, IA: Northwest Publishing Co., 1910); Victor C. Damell, *Directory of American Bridge-Building Companies: 1840-1900*, Occasional Publication No. 4 (Washington, D.C.: Society for Industrial Archaeology, 1984), 11, 85-86, cited in Heggland, 8/8-9; "Determination of Eligibility for Poplar Grove Road Bridge," by Heggland, 7/2, 8-8/1.

Double-Intersection pony truss. Originally built in 1883 for the Chicago & Northwestern Railroad and adapted for highway use in 1910, the span is 84 feet long, 29 feet 2.5 inches wide and carries a 23 foot 9 inch wide traffic deck. The overall length of the bridge, which also includes six approach spans (three on each side of the truss span), is 176 feet 8 inches. The approach spans, each of which is approximately 15 feet long, are supported by wooden uprights or pilings that are generally 8 to 13 inches in diameter, across which timber beams with approximate 12 inch by 12 inch dimensions lay.

The truss is anchored to the same track-side pilings as the approach spans that immediately flank it. The span's deck is carried by six, 25 inch by 12.75 inch floor beams built from plates and angles. Perpendicular to the floor beams are ten, timber deck stringers, each of which is approximately 8 inches by 15 inches. Similar stringers also carry the deck of the approach spans. The truss's bottom lateral bracing is comprised of 4 inch angles. Timbers that measure 9.5 inches by 5.5 inches, and number 215, complete the deck of the bridge--including the truss and approach spans.

Floor beams are attached to the lower chords which are fabricated from paired, 13 inch plates with 3 inch angles. With 10 inches between the plates, the overall dimensions of the lower chords are 13 inches by 16 inches. The inclined endposts and top chords are 15.75 inches by 12.75 inches and fabricated from plates and channels. The top chord is 8 feet 4 inches above the traffic deck.

The panels of the truss, and thus the positions of the floor beams, are defined by the diagonals which, in a Double Intersection Warren, convey a "lattice-like" appearance. The diagonals in panels two and six are comprised of paired, 3 inch angles placed back-to-back with overall dimensions of 16 inches by 6 inches, as well as paired 3 inch by 2.5 inch angles with lacing and total measurements of 9.25 inches by 6 inches. In panels three and five, the diagonals are constructed from paired, 5 inch by 3 inch angles and from 4 inch by 3 inch angles with lacing and overall proportions of 9 inches by 4 inches. Finally, the diagonals in panel four are fabricated from 3 inch angles with lacing that produce dimensions of 9 inches by 3 inches, as well as from 3 inch angles with lacing that are positioned to create a size of 16 inches by 3 inches. The panels are further defined and the truss strengthened by hip and intermediate verticals. The former are fabricated from paired, 2.5 inch by 3 inch angles placed back-to-back, while the latter, two of which are immediately adjacent to the hip verticals, are formed from single, 3 inch angles. The placement of the intermediate verticals is such that one angle is attached to each side of the top chord. Paralleling each other for several inches, the verticals turn in, cross and terminate at the floor beam where a distance of 29.5 inches separate the two vertical components--much of that distance accommodated by floor beam extensions that are placed above and project beyond the lower chords.

All connections are riveted.

The truss span has no ornamentation. It does, nevertheless, have a two course railing anchored to 5.25 by 3.5 inch, timber uprights. The top chord is 46.25 inches above the deck, while the lower is 28 inches above. Both chords are 5.25 inch by 1.25 inch boards.

C. Setting:

The bridge is located in the Town of Lebanon, at that point where Poplar Grove Road crosses the Chicago & Northwestern Railroad's tracks. The area around the bridge, the latter being oriented on a north northwest/south southeast axis, is all rural. Farm fields and/or wetlands are generally found in all directions, while a small farm and related business are immediately to the northwest. The community of Lebanon is approximately 1.7 miles to the west.

PART III. SOURCES OF INFORMATION

A. Bibliography:

1. Primary or unpublished sources:

Hess, Jeffrey, Robert M. Frame, III, Robert S. Newbery and John N. Vogel. "Bowen Mill Bridge." Historic American Engineering Record (HAER) Report, HAER No. WI-67 (1992). Copy on file at the Library of Congress, Washington, D.C.

"National Register of Historic Places Determination of Eligibility Form for Poplar Grove Road Bridge." Prepared by Timothy F. Heggland, 11 December 1993. Copy on file at Heritage Research, Ltd., Menomonee Falls, WI.

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2. Secondary and published sources:

A Century of Wisconsin Agriculture, 1848-1948. Madison: Wisconsin Crop & Livestock Reporting Service, 1948.

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20 December 1996

PART IV. PROJECT INFORMATION

This project has been sponsored by the Wisconsin Department of Transportation. Gremmer, Ohm, Towig & Due, consulting engineers in Fond du Lac, Wisconsin, formally acted as the contracting agency. The project was directed by Dr. John N. Vogel, Principal Investigator and Sr. Historian for Heritage Research, Ltd. (HRL), who provided the photographic documentation and the architectural/technical data. He also edited and prepared the final document. The general truss bridge context was originally prepared by Jeffrey Hess, Robert Frame, III, and Robert Newbery in a report for the Wisconsin Department of Transportation. That context was edited and summarized by Dr. Kevin Abing.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

POPLAR GROVE ROAD BRIDGE
Lebanon Vicinity
Dodge County
UTM Coordinates
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